PROPERTY ANALYSIS REPORT OF BELFIELD

Data Collection and Preparation Process

The data of the suburb Belfield were collected from 2 sources, mainly from the Australian Bureau of Statistics (ABS) for census data and price finder for property (house & unit) price. The dataset consists of data from 2001, 2006, 2011, 2016 and 2021 to see a clear comparison and changes of Belfield across time. Some attributes, however, requires manual calculation in order to get the data such as calculating household weekly income where the monthly income is collected from ABS and divided by 4.345(weeks in a month) to get its weekly income. Other fields such as percentage of occupied and unoccupied dwellings also needed manual calculation in order to display its percentage weight.

Dataset's Characteristics and Data Types

Categories	Characteristics	Data Type	Data Source
Housing Prices	It includes housing and unit prices displayed in dollar amount	Interval	Price Finder
Income and Property Expense	It includes median personal/family/household weekly income, median mortgage weekly payment and median weekly rent displayed in dollar amount	Interval	ABS
Housing Details	It includes total private dwelling, average motor/bedrooms/people per dwelling displayed in numeric value	Ratio	ABS
Marital Status	It includes married, separated & divorced, widowed, and never married status displayed as percentage	Ratio	ABS
Employment Status	It includes percentage of full time, part time and unemployed people in the area	Ratio	ABS
Household Details	It includes percentage of couple family with/without children, one parent family, other family, and single/group households	Ratio	ABS
Housing Tenure	It includes percentage of fully owned, owned with mortgage and rented properties	Ratio	ABS
Dwelling Details	It includes percentage of separate house, semidetached, flat unit apartment as well as number of bedrooms in each property	Ratio	ABS

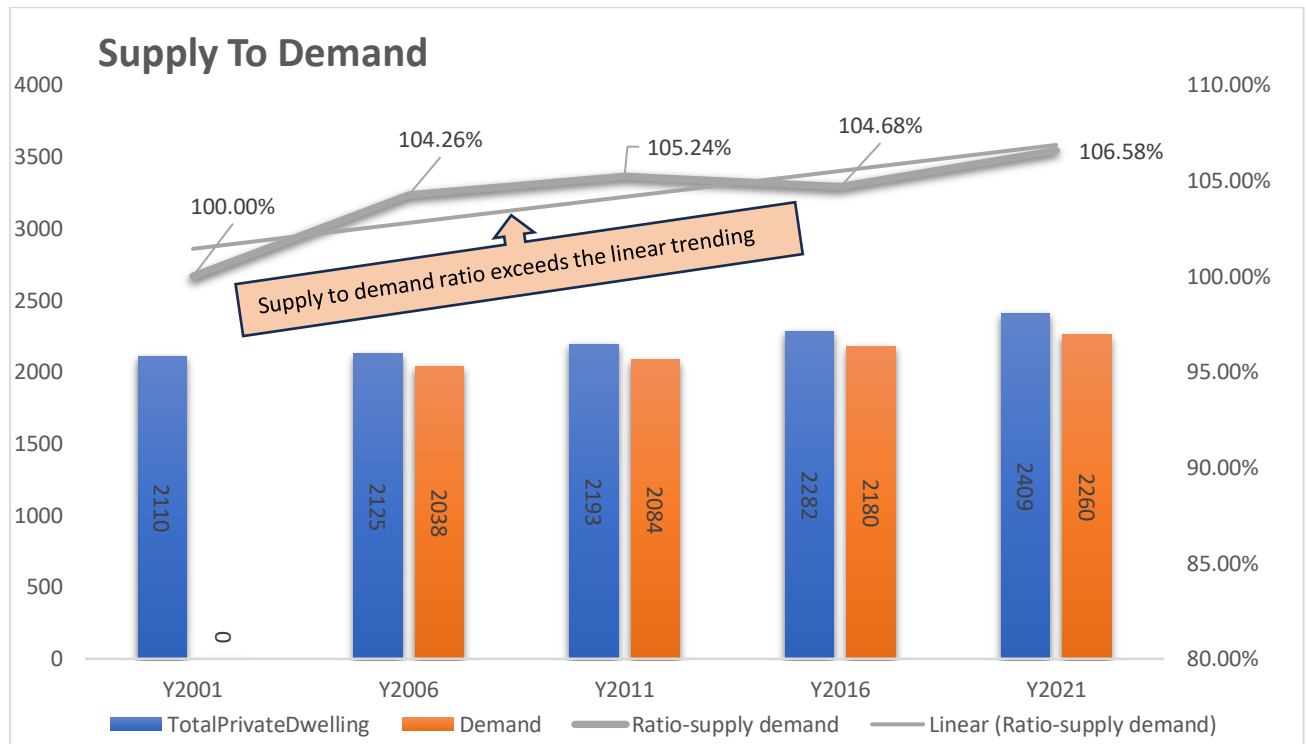| Property Occupancy Status	It includes percentage of occupied and unoccupied dwellings in the area	Ratio	ABS

Property Supply and Demand

Figure 1: property supply and demand

The Supply to demand combo chart shows the number of available supplies of dwelling against with the number of demands within the population. A supply to demand ratio is created to illustrate and emphasise on the percentage of housing supplies movements. The linear trend label shows the trend direction of the supply to demand ratio and between 2006 and 2011, the actual ratio has exceeded/over performed the trending figure. It is therefore conveying the message that the property supply to demand ratio in Belfield will continue to increase, following the trending line as more supply is given to its current demand. As such, it is expected that property price movement will remain stable or possibly decrease in the future.

To effectively convey and display multiple data in a chart for meaningful comparison, combo chart was used where number of dwellings and demand is displayed using the left axis and simultaneously, able to show its supply to demand ratio using the right axis regardless of the different scales or units of measurements. Re-scaling on both the axis to ensure the column chart doesn't collide/overlap with the supply to demand ratio, allowing the chart to focus on the storytelling and ease of readability where clear comparison can be shown. Data labels on the line and column chart was used to further enhance its readability and highlighting the important information to the reader.
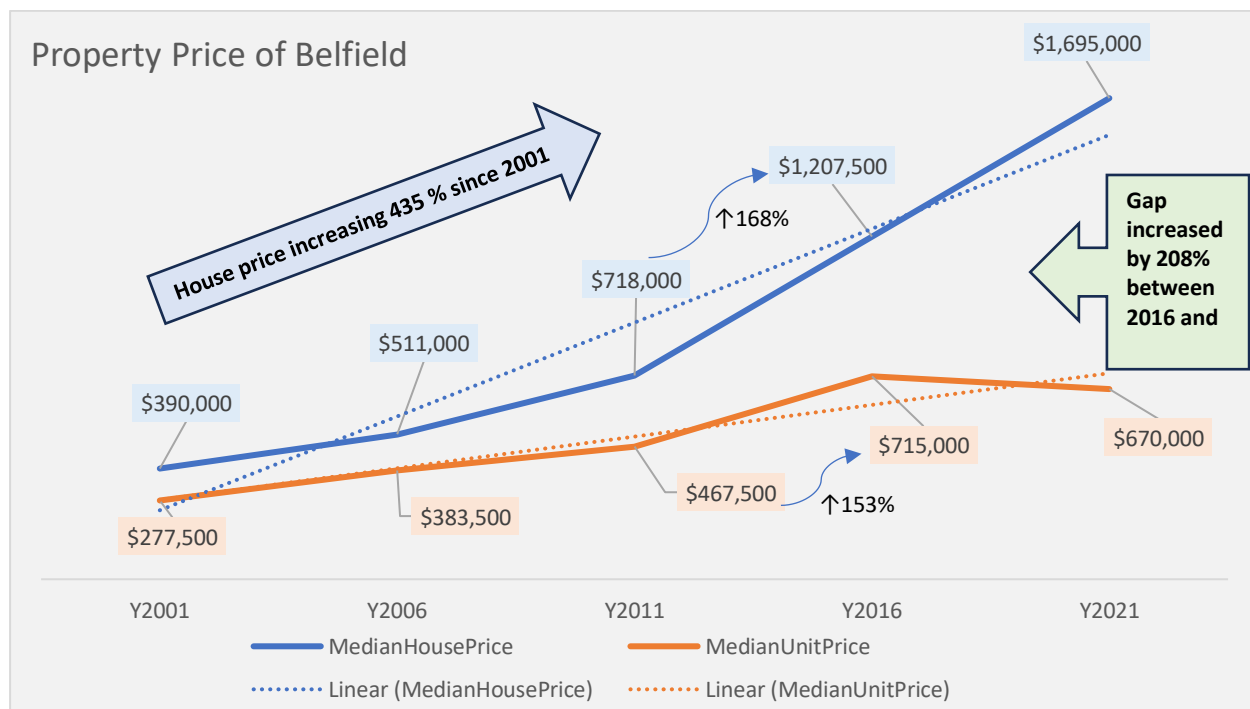
Property Price Movement

Figure 2: property supply and demand

The property price movement chart shows the price movement of house and unit price in Belfield over time. The line chart is used to effectively illustrate the growth of property prices in Belfield and along with a trend line, it is expected to see that the property price may continue to rise. In 2021, the house price has increased 435% since 2001 while unit price also increasing moderately. This makes the property price gap between house and unit larger as the gap increased by 208% between 2016 and 2021. In reference to figure 2, it can be clearly seen that as the supply to demand ratio decreased between 2011 and 2016, both the house price and unit price therefore increased, with a 168% increase in housing price and 153% increase in unit price.

Line chart was the most appropriate to illustrate property price movements as the data involves in interval of times in which trends of housing and unit price can be visualized clearly. Labelling was used to show the value of each data point and as such, the axis is removed to save space and enhance readability of the graph. By using different colours, readers can easily differentiate among the two groups for comparison.
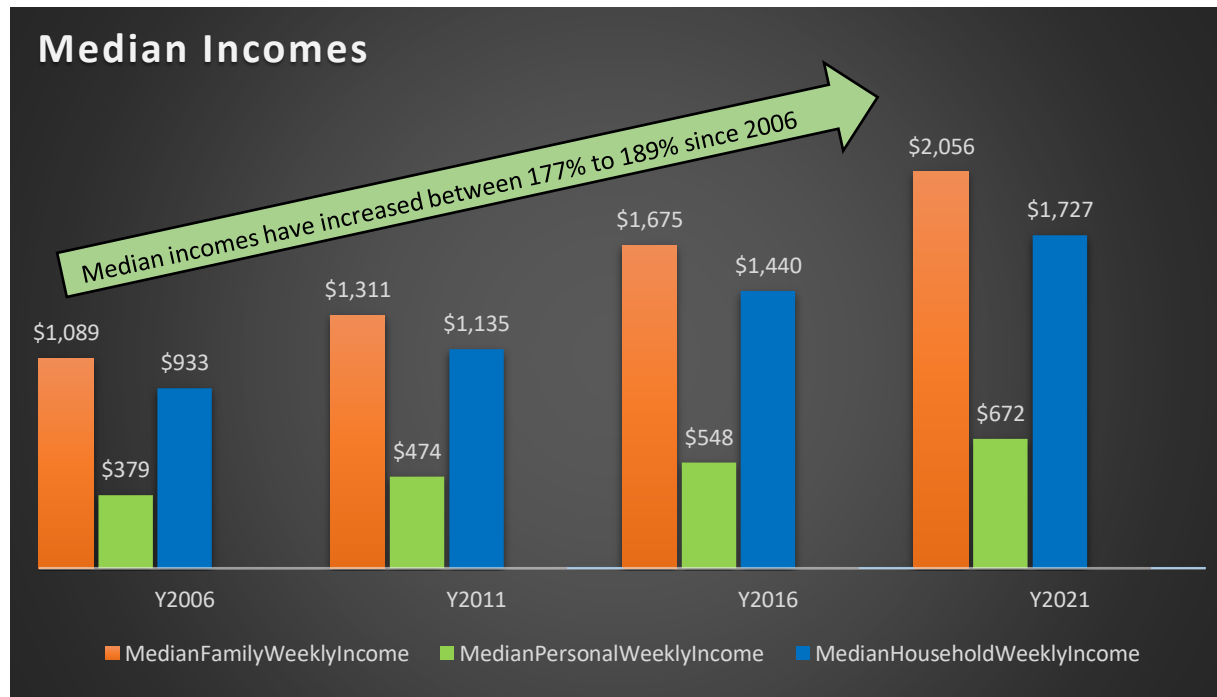
Finance Status

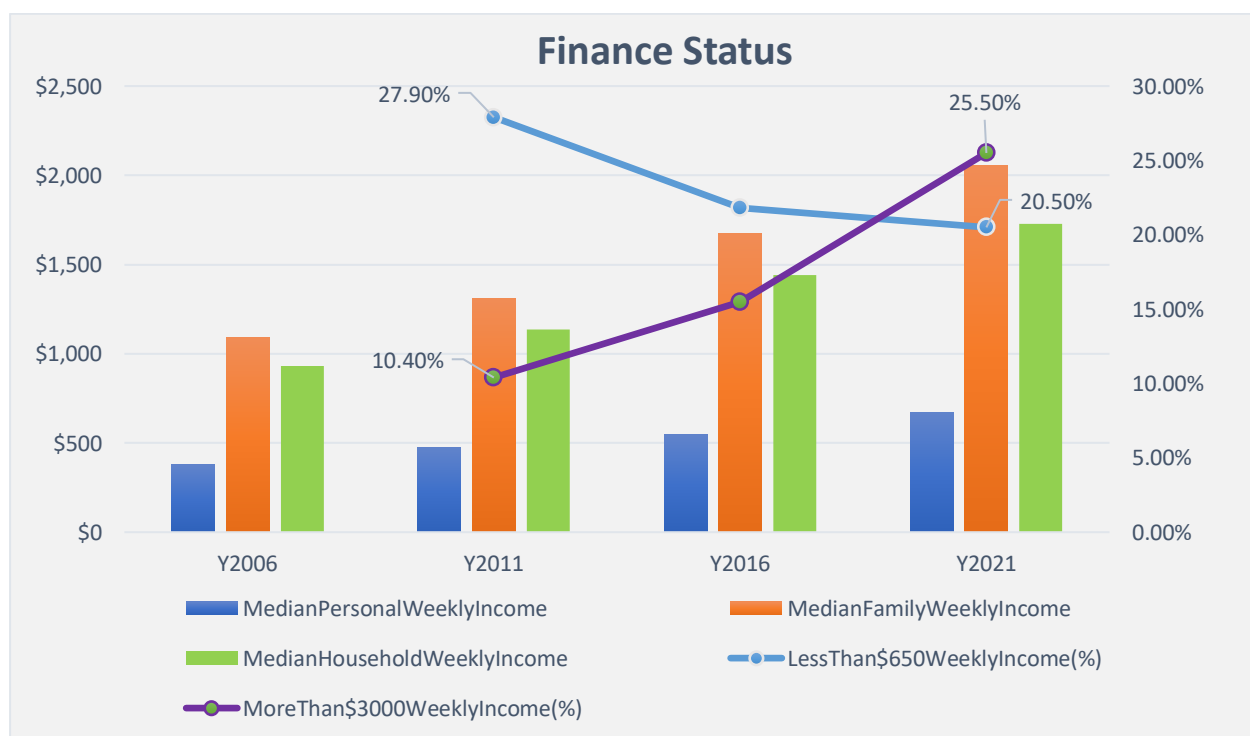
Figure 3: Median Incomes

Figure 4: Finance Status

The median income chart illustrates the median income among family, personal and household per week within Belfield. Since 2006, the median incomes have increased between 177% to 189%. As the median income have increased, it is expected that demand for property within Belfield will also increase, thus as shown by figure 2, property price has been increasing every year since 2006. As

figure 4 finance status chart shows that percentage of weekly income less than $650 have been decreased from 27.90% in 2011 to 20.50% in 2021 while weekly income more than $3000 have been increased from 10.40% in 2011 to 25.50% in 2021. It suggests that the population within Belfield is getting wealthier and as such, will directly contribute to more property demands as more people tend to buy houses with mortgages (see figure 6).

For figure 3, column chart was used to clearly compare the three different income groups and it is focusing directly on the story/key point without overcomplicating it. Data labels were used to improve readability of the graph and saves space by removing the axis. Figure 4 were using combo chart to ensure effective storytelling as it involves comparison of data in different scales, with left axis showing income in dollar amount and right axis showing percentage of change. Different colour were used to improve the readability of the graph and along with data labels, highlighting key storytelling of the graph which allows the reader to receive the key message from the graph.
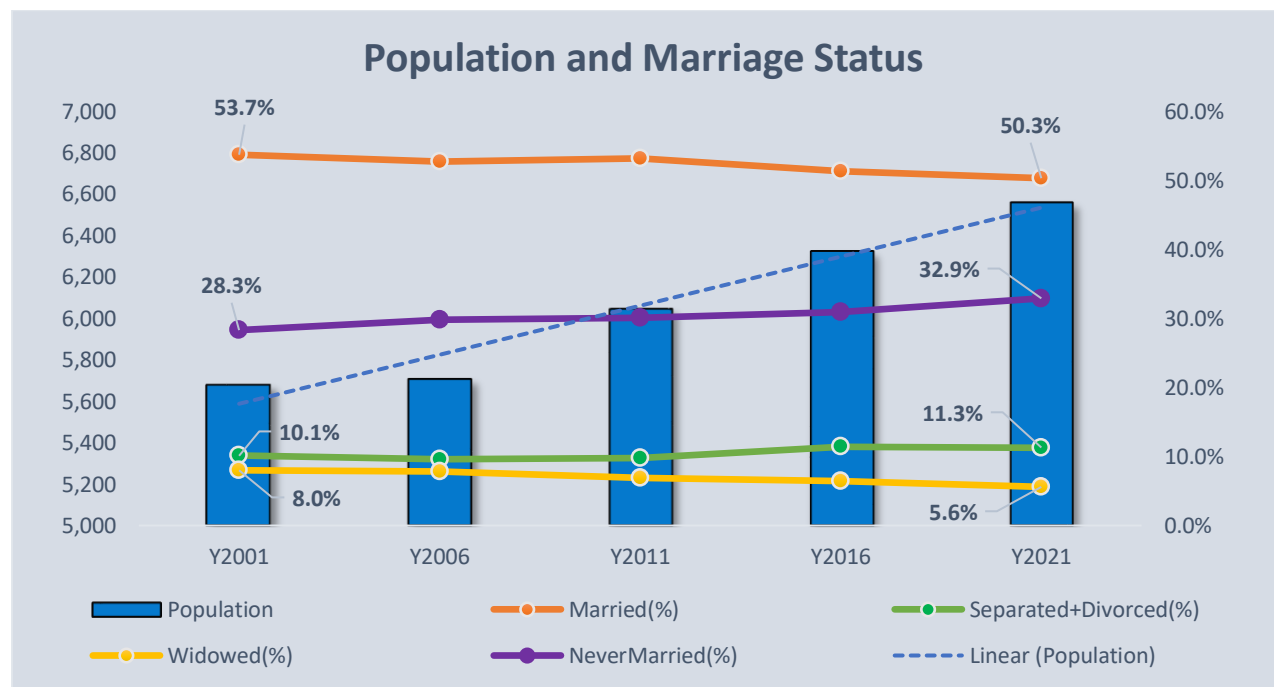
Population and Marriage Status

Figure 5: Population and Marriage Status

The population and marriage status chart shows the population of Belfield and the marriage status of the population, whether they are married, separated & divorced, widowed or never married. The trend line used for the population shows that the population is increasing every year and is expected to increase more in the future following the trending pattern. The marriage status within Belfield, as shown by the graph, illustrates married population is decreased from 53.7% in 2001 to 50.3% in 2021, separated and divorced increased from 10.1% in 11.3% while never married population increased from 28.3% to 32.9%. This suggests that there may be lesser family but more single person (potentially more foreigners/migrants) within Belfield where demand for units will increase, thus, increasing price movements of unit properties.

The combo chart is used to clearly show the relationship between data despite different scales between the population number and the marriage status within the population, expressing as percentages. Data label is again used for each marriage status on the line (beginning and end) to focus on the storytelling of movements in each marriage status from 2001 to 2021. This will also enhance

the readability of the line as the percentage change difference in each data point can be hard to see. Both axes have also been rescaled to save space and enlarge the visuals so that it focuses on storytelling the key elements.

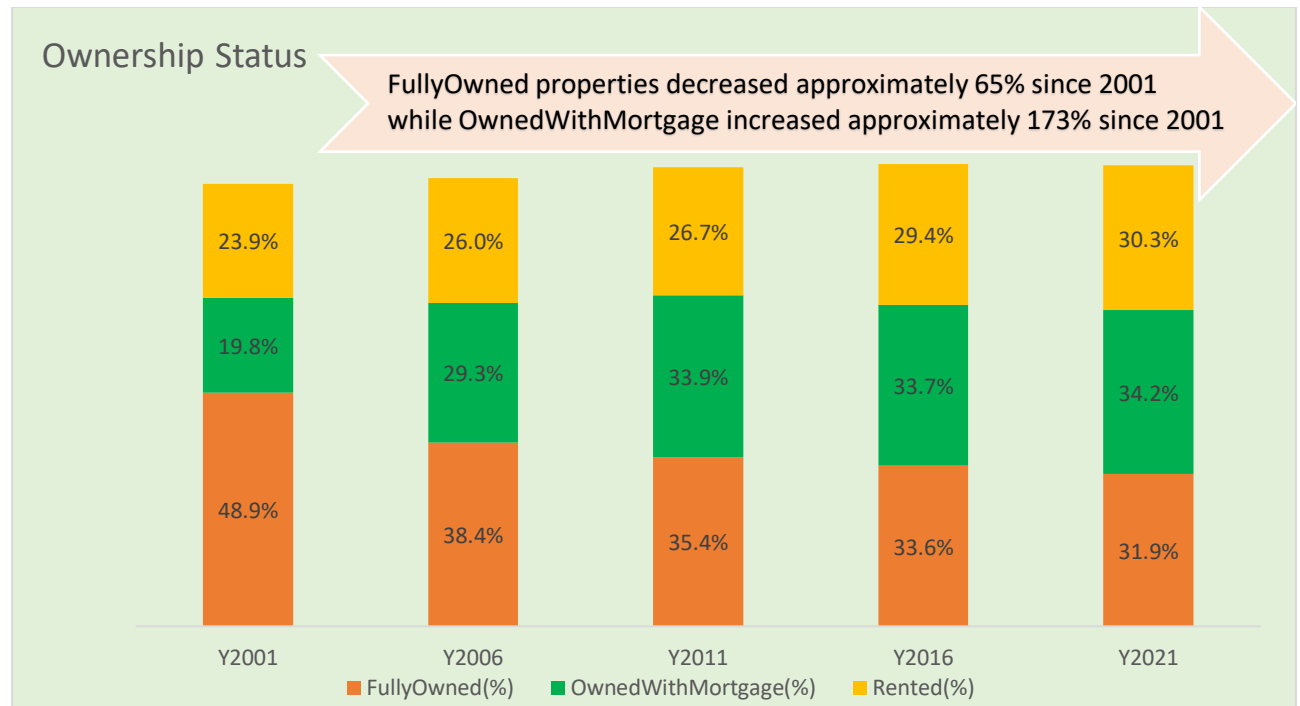**Household Ownership Status**

Figure 6: Household Ownership Status

The ownership status chart shows the percentage of population who have fully owned property, owned with mortgage, or rented a property in Belfield. From the graph, it can be clearly seen that percentage of fully owned property decreased approximately 65% since 2001 while owned with mortgage property have increased approximately 173% since 2001. In reference to figure 5 where population growth consists with increasing single person directly results with increasing rental rate within Belfield. Furthermore, in figure 3, it shows that with the personal weekly income, single person may not be able to afford a property with a mortgage as mortgage expense is higher than weekly rent.

The stacked column chart is used to effectively illustrate the percentage of household ownership status as it adds up to a meaningful total, mimicking the population growth within Belfield. Different colour labels were used to ensure each data group is differentiated from each other. Labelling was also used to enhance readability and saving the space of the graph as the axis is removed from such action.
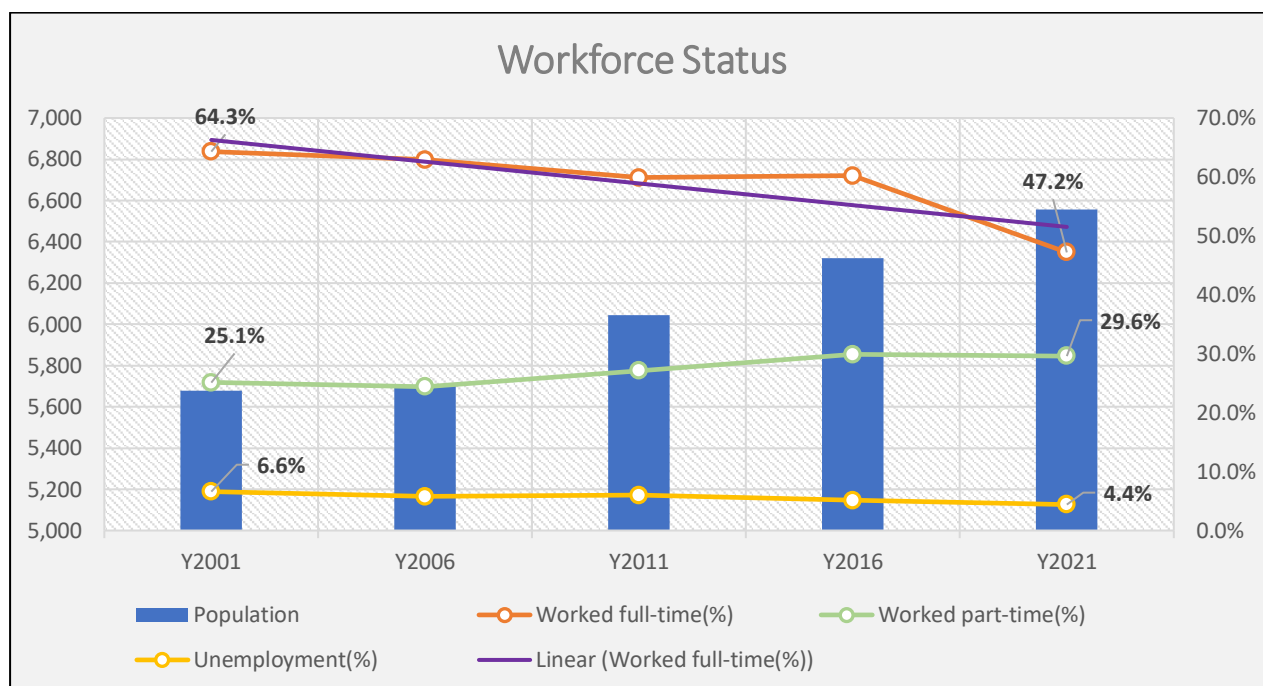
Workforce Status

Figure 7: Workforce Status

The workforce status chart illustrates the percentage of population with full time and part time employment as well as unemployment rate. From 2001 to 2021, full time workers decreased from 64.3% to 47.2% while part time workers increased from 25.1% to 29.6%. Current trend of full-time employment as illustrated by the linear trend line is sloping down and it may be predicted based on current trend that full time employment will continue to drop while part time employment continues to increase.

The combo chart is used in order to illustrate percentage of workforce status against with the population number so that it can be easily compared. Rescaling took place for population axis where unnecessary values were removed to save space and make the bars look shorter so its more visually appealing. Data labels were used for all work status lines to emphasise on storytelling with the change and simultaneously, improve its readability.
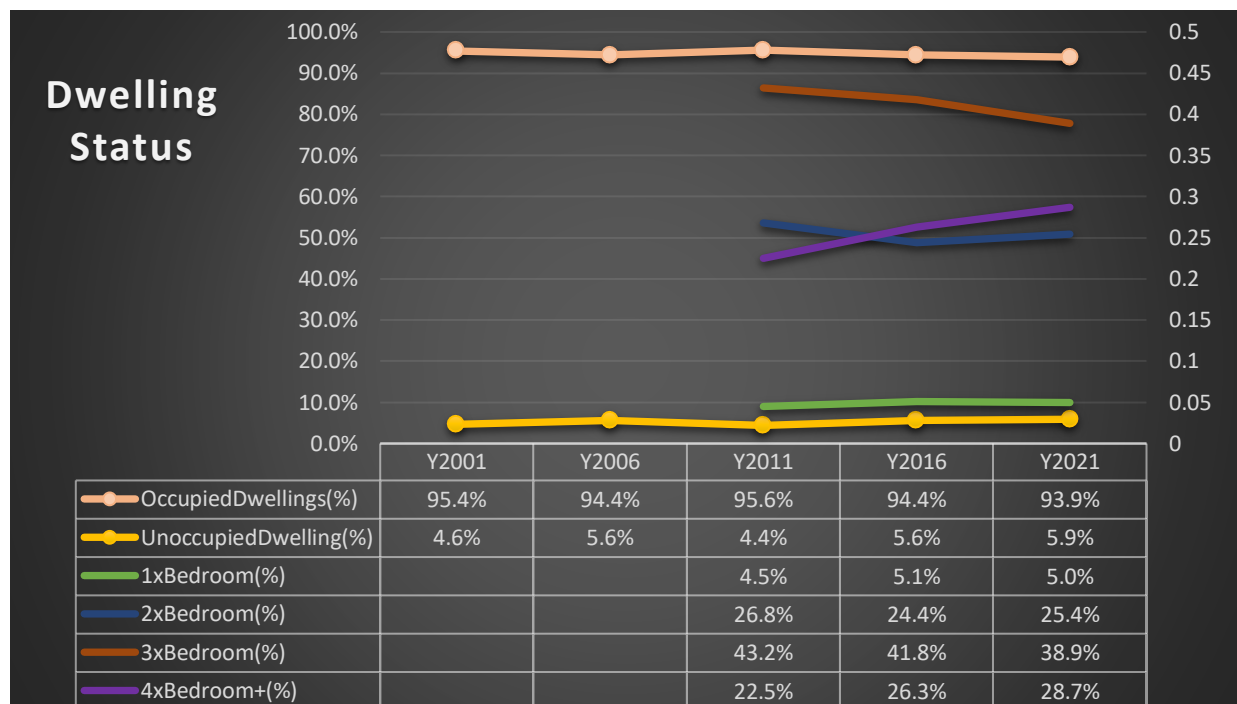
Dwelling Status

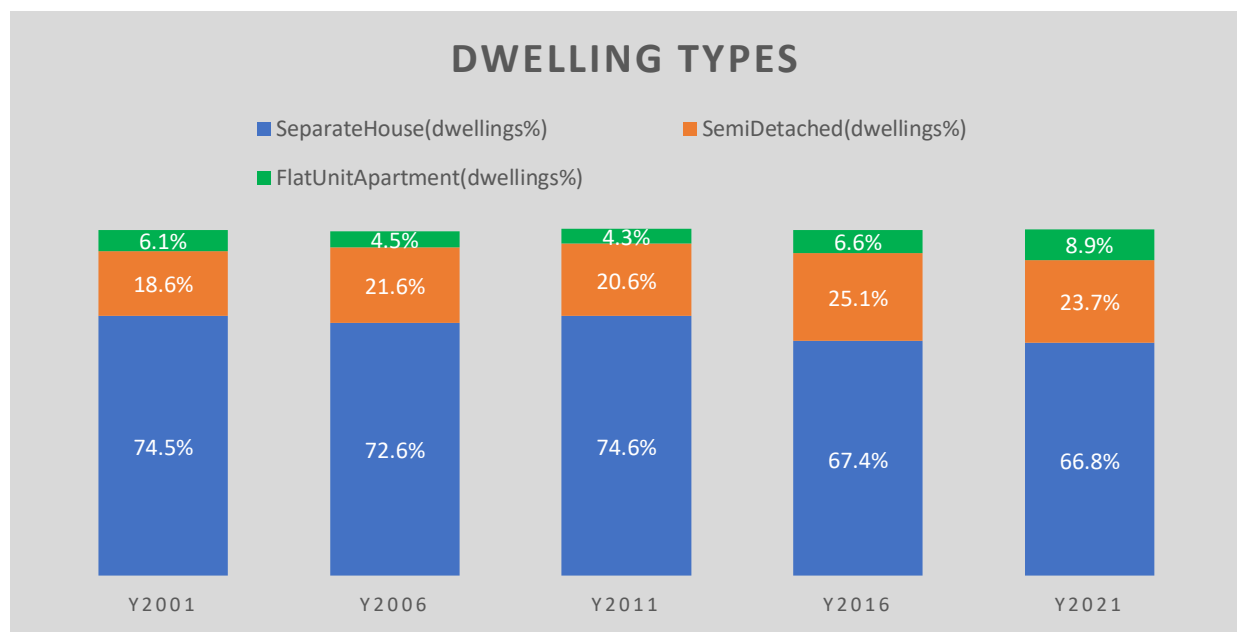|	Y2001	Y2006	Y2011	Y2016	Y2021
OccupiedDwellings(%)	95.4%	94.4%	95.6%	94.4%	93.9%
UnoccupiedDwelling(%)	4.6%	5.6%	4.4%	5.6%	5.9%
1xBedroom(%)			4.5%	5.1%	5.0%
2xBedroom(%)			26.8%	24.4%	25.4%
3xBedroom(%)			43.2%	41.8%	38.9%
4xBedroom+(%)			22.5%	26.3%	28.7%

Figure 8: Dwelling Status

Figure 9: Dwelling Types

The dwelling status chart shows the percentage of occupied and unoccupied dwelling in Belfield from 2001 to 2021 and along with that, it also shows the percentage of number of bedrooms within the dwellings. The line chart illustrates occupied dwellings was decreasing since 2011 which therefore resulted in occupied dwellings to increased. This could be explained by the increasing supply of properties in the suburb where figure 2 shows an increase of supply to demand ratio. The number of one bedroom have increased slightly from 2011 and remained stabled while the number of 3 bedroom have decreased since 2011. This has occurred as the figure 9 dwelling types chart shows the percentage of flat unit apartment have increased while separate house have decreased dramatically.

This shows the proportion that are single person or potentially migrants are increasing within Belfield. Interestingly, the number of 4-bedroom dwellings have increased since 2011 which may have been contributed to increasing number of unoccupied dwellings as it fails to meet the needs of the demographic. Since occupied dwellings have been decreased slightly in Belfield, it's expected that housing price and unit price to remain constantly stable or increasing slowly.

For figure 8, the combo line chart is used to effectively illustrate the percentage of change the data and as the line may be complicated to see, a table is incorporated to increase its readability. Each line is differentiated using different colour and axis for bedroom percentage is rescaled to avoid unnecessary numbers. For figure 9, a stacked column chart is used to illustrate different dwelling types as it adds up to a meaningful value. Labels were used for each data point to enhance readability and saves up space by removing the unnecessary axis.
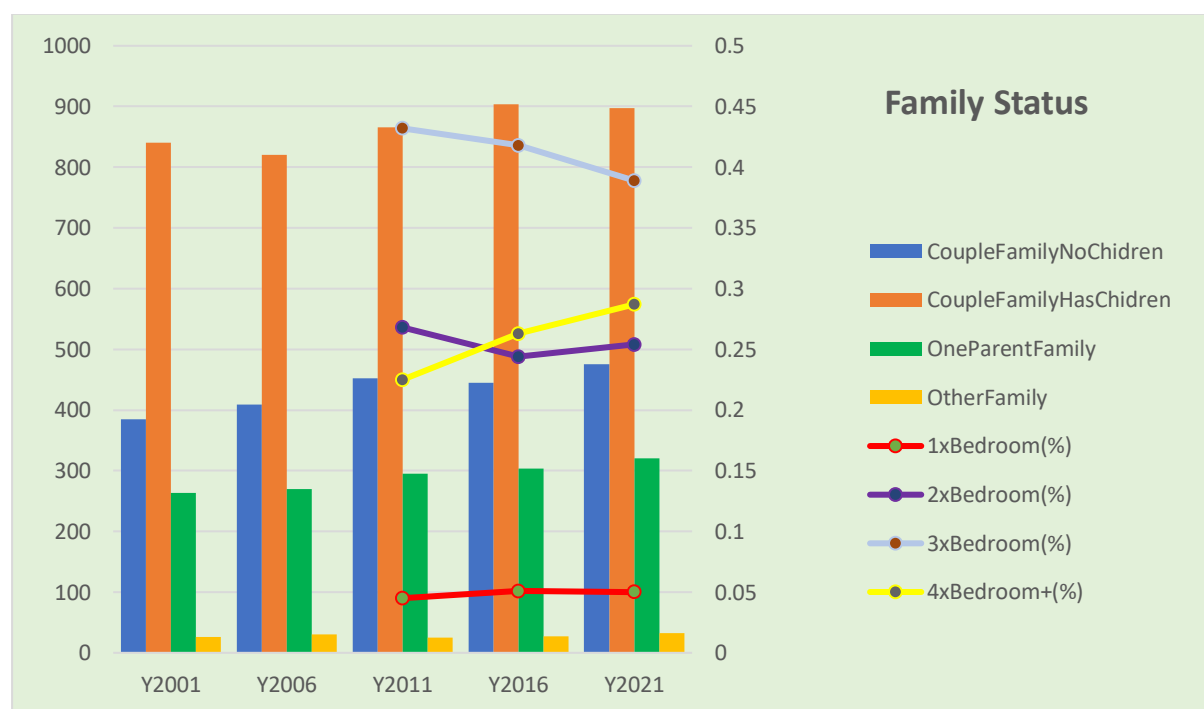
Family Status

Figure 10: Family Status

The family status chart illustrates the number of family that has no children, has children, one parent family as well as other family in Belfield. The chart shows an increasing number of one parent family since 2001 while couple families with no children and has children increased slightly and remained stable. As one parent family has increased, the percentage of 1 bedroom and 2-bedroom dwellings increased slightly. As such, it is expected unit price to remain constant or possibly increase in the future. As couple family has children covers almost half proportion of the family status, it has shown 4-bedroom dwelling have increased while 3 bedrooms have decreased, showcasing that majority families have more children that may be requiring more bedrooms. Therefore, it may also drive price movements of housing to increase in the future.

The combo chart is used to illustrate data with different scales which ensures effective storytelling of the family status and how it may impact on the property demand, ultimately impacting on property price movements. Different colours are used to differentiate between data groups and re-scaling technique is used to further focus the graph on story by removing unnecessary scales.

Challenges Encountered During Data Visualization Process

During data visualisation, there were some issues that needed to be dealt with in order to deliver optimised readability and storytelling.

Challenges	Solutions
Data cross/overlapping	- Applying different colours and legends to differentiate between data groups. - Rescaling technique used to create more separation between the lines by increasing axis range. - Data labels crosses over the line which is solved by moving the labels apart from the line so that it can be visibly seen.
Axis scale issue	Axis limit is adjusted by setting a suitable minimum and maximum value which can save up space while focusing on necessary data to engage in storytelling.
Readability of the graph	- All graph is engaged with strong colour contrast to enhance its readability. - Using the column and row switch technique to further improve the readability and storytelling of the graph. - Labels were used to convey key information that allowed readers to see the numbers clearly and as such, axis is removed to enhance appearance of the graph.

Recommendations

For buyers, Belfield is a suburb that is suitable for a larger family as 4 bedrooms dwellings have increased since 2011 or a single person household as the number of unit with 1 and 2 bedrooms have increased in general while unit price have decreased in 2021.

For investors, as the housing price in Belfield have been increasing since 2001, based on the current trending using the trend line and along with increasing population, it is expected that housing price will continue to increase in the future to an extent. Although unit price has slightly decreased over the past 5 years from 2016, it is expected to slightly increase in the future as coupon family with no children and proportion of population that aren't married have increased overtime. This may increase the demand of unit with 1 or 2 bedrooms as it's more suitable and affordable to them. Ultimately, it is recommended that investors invest in Belfield as the property prices still perceives favourable and expected to increase based on current trend.

Advantages of visualisations approaches

Visualisation approaches	Advantages
Line Chart	- able to show trend or patterns in data over a continuous range/time series, making it easy to see how values changed over time. - Effective at highlighting relationships between different data points - Useful to making predictions using current trend and incorporating a trending line
Combo Chart	- Able to visualize and compare data of different data types/scales, helps understanding relationship between different variables. - Provides flexibility in presenting complex data sets
Stacked Column Chart	- Displaying data that adds up to a meaningful total, showing how individual components contribute to the overall total. - Able to compare groups across different categories and time periods
Column Chart	- Best suited graph for comparing categories or groups of data in a simple and straightforward way. - Easier to interpret due to its simplicity. - Effective at emphasising differences between data points

References

ABS. (n.d.). *Search Census Data*. Search Census data | Australian Bureau of Statistics. https://www.abs.gov.au/census/find-census-data/search-by-area

Pricefinder. (n.d.). *pricefinder.* https://www.pricefinder.com.au/